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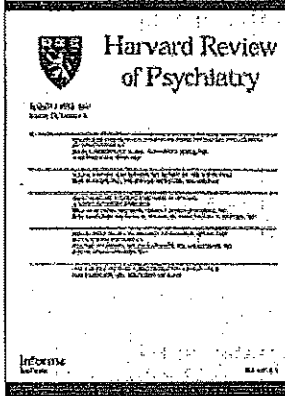
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Is There an "Abortion Trauma Syndrome"? Critiquing the Evidence

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PERSPECTIVES

Is There an "Abortion Trauma Syndrome"? Critiquing the Evidence

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The objective of this review is to identify and illustrate methodological issues in studies used to support claims that induced abortion results in an "abortion trauma syndrome" or a psychiatric disorder. After identifying key methodological issues to consider when evaluating such research, we illustrate these issues by critically examining recent empirical studies that are widely cited in legislative and judicial testimony in support of the existence of adverse psychiatric sequelae of induced abortion. Recent studies that have been used to assert a causal connection between abortion and subsequent mental disorders are marked by methodological problems that include, but not limited to: poor sample and comparison group selection; inadequate conceptualization and control of relevant variables; poor quality and lack of clinical significance of outcome measures; inappropriateness of statistical analyses; and errors of interpretation, including misattribution of causal effects. By way of contrast, we review some recent major studies that avoid these methodological errors. The most consistent predictor of mental disorders after abortion remains preexisting disorders, which, in turn, are strongly associated with exposure to sexual abuse and intimate violence. Educating researchers, clinicians, and policymakers how to appropriately assess the methodological quality of research about abortion outcomes is crucial. Further, methodologically sound research is needed to evaluate not only psychological outcomes of abortion, but also the impact of existing legislation and the effects of social attitudes and behaviors on women who have abortions. (*HARV REV PSYCHIATRY* 2009;17:268-290.)

Keywords: abortion, abortion trauma, depression, mental health, post-abortion syndrome

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Abortion is a fact in the lives of many women. The *World Health Report 2005*¹ estimates that approximately 211 million pregnancies occur worldwide each year; 46 million end in induced abortion. Forty percent of these abortions are performed in unsafe conditions, resulting in 68,000 maternal deaths. In the United States, approximately 1.3 million of the 6 million pregnancies each year end in induced abortion.² Approximately 20% of American women of child-bearing age have already had an abortion; it is estimated that one out of three American women will have had one by age 45.²

Maternal safety is a concern for any reproductive health care policy. The relative risk of death in the United States from an abortion is only 1:160,000, however: lower than childbirth, appendectomy, or tonsillectomy.³ Given the high physical safety of legal abortion, the ongoing policy debates revolve around questions of psychological harm.

More than a decade ago, several reviews of the scientific literature on the psychiatric sequelae of abortion,⁴⁻⁶ including a meta-analysis,⁷ came to the same general conclusion: clinically significant adverse symptoms occur in a minority of women, and when they do occur, their strongest predictor is mental health before the abortion. Further, results were found to depend on the research design used, pointing to the importance of methodological issues. Designs comparing pre- and post-abortion indicators of mental health found women to be between 0.50 and 0.60 of a standard deviation better off after the abortion. Designs based on comparison groups, which have varied in nature and often include comparisons with women delivering wanted pregnancies—have yielded mixed results: women who had an abortion were found to range between 0.04 of a standard deviation better off and 0.08 of a standard deviation worse off in comparison to other groups of women.⁷

In January 1992, JAMA published a Commentary by Nada Stotland entitled "The Myth of the Abortion Trauma Syndrome,"⁸ which concluded that no scientific evidence supported the existence of a psychiatric diagnostic entity related to induced abortion. Since that time, the literature on the subject has grown, with articles variously concluding that abortion either does or does not cause mental health problems. The existence of an "abortion trauma syndrome"⁹ has again been postulated, as well as "post-abortion depression and psychosis."¹⁰ These "syndromes" (not recognized in the *Diagnostic and Statistical Manual of Mental Disorders* of the American Psychiatric Association),¹¹ as well as other claims about mental health effects, have been used as a rationale for changes in U.S. public policy, both nationally and in individual states—for example, by requiring physicians to inform patients that abortion will increase their risk of depression and suicidality. These beliefs have also affected medical student education. Organizations such as Medical Students for Life¹² reportedly offer presentations (outside the formal curriculum in many medical schools) asserting the existence of these "syndromes." Indeed, in 2008 the United Kingdom's Royal College of Physicians, in response to a request from the government, issued a new statement about abortion that characterized the research evidence as "inconclusive—some studies indicate no evidence of harm, whilst other studies identify a range of mental disorders following abortion," and that called for women seeking abortions to be given information about the risks and benefits.¹³

The quality of the research cited in these activities varies widely, but flaws in the research are not always apparent to individuals who lack in-depth knowledge of the abortion research literature. Further, although editors discourage inappropriate attribution of causal effects in published articles, testimony and amicus briefs have no such restrictions and often include unfounded interpretations of findings that contradict cautions published in the articles themselves.¹⁴

Thus policymakers, as well as patients, medical professionals, medical educators, and researchers, need information about the relevant conceptual and methodological issues in order to (1) critically evaluate the quality of research findings on the relation of abortion to mental health, and (2) base decisions related to public policy, clinical care, medical education, and research upon thoughtfully assessed empirical evidence.

This article has three sections. We first give an overview of key methodological issues to be considered in evaluating and interpreting research on the psychological consequences of induced abortion. Methodological issues considered include: sampling and generalization; appropriateness of comparison groups; conceptualization and control of relevant variables surrounding the abortion decision; employment of recognized and meaningful measures of outcomes; application of appropriate statistical analyses for the data collected; and interpretation of findings, including avoidance of misattribution of causal effects. In the second part of the paper we summarize a number of studies that illustrate these methodological flaws and contrast those studies with some that are more methodologically sound. Finally, we present a summary of flaws of the empirical studies that use the most clinically relevant outcome measures, including suicide, death, physician diagnosis, and validated psychological measures, such as diagnostic interviews and instruments used to assess risk for mental disorder.

METHODOLOGICAL ISSUES

Sampling and Generalization

Samples are often not representative of women who have abortions. In some studies of abortion outcome, researchers recruited women who had already self-identified as suffering negative psychological effects from abortion, and then used the self-reports of these women as evidence for high rates of ill effects in all women who have had abortions; for example, a 1992 study by Franz and Reardon¹⁵ enlisted participants from the organization Women Exploited by Abortion. Other researchers have conducted studies using samples of drug-abusing mothers.¹⁶ Findings based on such samples are not appropriate for determining normative characteristics of women who have abortions or the prevalence rates of outcomes, and they provide no basis for generalization.

Numerous studies have been based on secondary analyses of large databases of health information. Subsamples of women who report having an abortion are selected and then compared to other subgroups of women. This strategy yields meaningful conclusions only if the original data collection permits control of factors known to be determinative of mental health outcomes associated with unwanted pregnancy.

Public data sets based on surveys or interviews often involve retrospective reporting of the variables used in sample selection. The use of retrospective reports of women who had an abortion years earlier is problematic. Recall bias can affect any individual's perspective on a historical event.¹⁷ Mood-related memory effects may also bias recall of both the abortion experience and the timing of previous psychiatric episodes—especially if many years have passed.¹⁷ Later feelings about an abortion may be influenced by subsequent reproductive experiences, failure to recall the circumstances leading to the decision to abort, current depression related to stressful life events, or the effects of public campaigns attributing psychological problems to abortion.

Findings from designs that use sampling exclusion as a means of controlling for preexisting mental health problems should be generalized only with caution. In addition to applying only to women with no history of the particular problem being studied, arguably such designs differentially advantage the delivery group by eliminating the women most vulnerable to the chronic stress of dealing with an unwanted child from the study sample. In choosing a sample, and if the goal is to generalize to all abortions, it is important to ensure that abortions occurring after the first trimester are not overrepresented. Delay in seeking abortion may be related to inadequate coping mechanisms, more ambivalence, less social support, barriers to access, poor maternal health, and detection of fetal abnormalities (which may involve terminating a wanted pregnancy). In addition, methods used to perform second trimester abortions may involve more pain.¹⁸

Previous adversity, including mental disorder, is more likely to be found among women with repeated unwanted pregnancies, whatever their outcome^{19,20}—which creates problems for studies that first identify a target pregnancy outcome (abortion vs. delivery) and then differentially exclude women with subsequent abortions from only the delivery group. In effect, this practice differentially excludes women with preexisting mental disorders from the delivery group, artificially elevating the profile of women who give birth.

Sometimes such studies focus on the woman's first pregnancy (as opposed to a first pregnancy that occurs during the time frame of the study that could actually be a later pregnancy for the woman herself). Note that while understanding the mental health consequences of abortion on the first pregnancy is an appropriate research question, generalizing the results to later pregnancy outcomes, when a woman may be older and in a different life stage, is not warranted.

Selection of Comparison Groups

Some studies of abortion fail to use a comparison group, or use as a comparison group other women in general²¹ or

women who have never been pregnant,²² who have delivered (with the wantedness of the pregnancy unspecified) but have never had an abortion,²³ who are currently pregnant,²⁴ who had a spontaneous abortion,²⁴ or who have delivered following wanted pregnancies. The indications, regulations, or circumstances regarding other medical procedures are not comparable to those associated with a voluntary, elective abortion. In particular, comparing women who have unwanted pregnancies or who are forced by circumstances to terminate a pregnancy to those who are pleased to be pregnant and are able to deliver a full-term wanted pregnancy will clearly bias the outcome. At a minimum, the appropriate comparison group for assessing relative risks of negative mental health outcomes of such abortions is women who carry *unwanted* pregnancies to term. An unwanted pregnancy is different from an unplanned pregnancy, which may end up being wanted or unwanted. Women with unwanted pregnancies are more likely to suffer from a number of co-occurring life stressors, including childhood adversity, relationship problems, exposure to violence, financial problems, and poor coping capacity, all of which contribute to emotional distress.^{19–21,25–27} These factors increase the risk of poor mental health, whether or not a woman has an abortion.

Analysis of Relevant Variables

The prevalence and incidence of abortion, childbearing, and mental disorder vary with basic demographic variables, including age, race/ethnicity, education, income, marital status, and parental status (including timing, spacing, and number of children). The need to control for such variables would seem obvious. As can be seen in Table 1 (presented below in section on "Assessment of Clinically Relevant Literature"), however, even studies with clinically relevant outcome measures may lack the most basic of controls.

Previous psychiatric history. Many studies attribute post-abortion mental states to the abortion experience without providing adequate control for pre-abortion mental states—even though the literature suggests that previous psychiatric history is the most consistent predictor of psychiatric disorders following abortion.^{5,8,28} Previous psychiatric history may itself be associated with the occurrence of unwanted pregnancy. Symptoms of depression can interfere with a woman's ability to refuse intercourse, use contraception, or negotiate for a partner's use of a condom. Mania and hypomania are frequently associated with promiscuous or impulsive sexual behavior. Psychotic disorders leave many sufferers vulnerable to sexual exploitation, as do alcohol and substance abuse.

Preexisting, co-occurring, and subsequent conditions. Studies that do not take into account preexisting or co-occurring

stressful circumstances in the lives of women having abortions may attribute emotional distress to the abortion when it is actually due to those other circumstances. Unwanted pregnancies occur for various reasons. Contraceptive methods can fail, or the woman's failure to use contraception may itself indicate preexisting problems and stressors, including exposure to childhood adversity and intimate violence. Rape, incest, or other forms of sexual coercion may result in unwanted pregnancies either directly or, through their mental health impact, indirectly. Once a woman is pregnant, others may pressure her to have, or not to have, an abortion, or she may consider it unwise to discuss her decision with them, narrowing her support network. She may have hoped to cement the relationship with a partner by getting pregnant, only to be abandoned. She may be carrying a wanted pregnancy, only to discover that the fetus has a severe defect. An overabundance of obligations and a paucity of resources may make it impossible for her to contemplate caring for a child. After abortion, a woman may feel a mixture of positive and negative feelings but be unable to talk about them for fear of being stigmatized for her decision. Even women who firmly believe that they made the right decision can have feelings of regret, guilt, and shame for having had to make the decision in the first place.

Access to abortion is increasingly limited in the United States. Many women have to travel significant distances, wait for one or more days between presenting for and receiving services, or enter abortion clinics through a group of anti-abortion demonstrators, a stressor that has been shown to be associated with psychological distress.^{29,30} These barriers may add to the financial costs of abortion and may contribute to stress, feeling stigmatized, and other psychological reactions.³¹

In some states, physicians are required to repeat specified language to patients seeking abortions, or to give them state-designated printed material describing, with varying levels of scientific accuracy, the risks of abortion, fetal development up to term, and unsubstantiated allegations of fetal pain at early periods of gestation. In one of the few experimental studies related to abortion, Mueller and Major³² found that increasing a woman's belief in her ability to deal with having an abortion decreased her likelihood of experiencing depressive symptoms following abortion. Such findings suggest that insofar as inaccurate "informed consent scripts" undermine a woman's belief in her ability to cope after an abortion, they may contribute to her risk for depression. Moreover, insofar as a woman comes to feel stigmatized, she will be more likely keep the abortion a secret and, in trying to suppress thoughts about it, may be at higher risk for intrusive thoughts. Both suppression and intrusive thoughts are positively related to increases in psychological distress over time.³¹

Measures of Outcomes. A variety of methods have been used to assess post-abortion mental states, including: validated, as well as psychometrically questionable, psychological measures of psychiatric symptoms; mental health admissions records; items on health surveys performed for other reasons; checklists or open-ended self-reports of negative feelings; and single-item questions. Solely relying on self-reports of "feelings" about abortion, rather than measures of known reliability and validity, to assess mental health status raises a variety of concerns. Causal attributions for psychological distress can be misplaced even for conditions that have not been the target of public campaigns, such as those that have encouraged women to see abortions as causing psychological problems. Sometimes in retrospective reporting, the timing of events is not clear (e.g., as to whether an abortion or the initial visit to a counselor came first); the abortion's coming first is a necessary, though not sufficient, condition for making a causal attribution.

Studies of abortion sequelae should distinguish emotions or other psychological parameters such as self-esteem from clinically significant disorders; for example, depressive feelings should be distinguished from clinical depression. Feelings may be mild, temporary, and self-limited, or intense and persistent, but do not in themselves constitute pathology and do not require treatment; for example, feeling regret is not a psychiatric condition. Moreover, few studies ask about positive outcomes that may offset any existing negative feelings or put them in perspective; for example, women may feel a slightly sad and guilty about having an abortion, but extremely relieved and satisfied with their decision.

Application of appropriate analyses. Performing secondary statistical analyses of large data sets requires the use of appropriate statistical techniques that control study-wide error, as the use of multiple *t*-tests will increase odds of obtaining statistically significant findings by chance.³³ Coding errors and failing to weight survey data based on complex sampling designs make interpretation of results problematic. In studies of the impact on mental health of abortion versus delivery following a first pregnancy, a major design flaw results from controlling for overall parity rather than for births subsequent to the initial pregnancy; by including the initial birth in the covariate, one controls for its negative effects, thus biasing the findings in the direction of the delivery group.

Inappropriate interpretations and conclusions. Assessment of the quality of a particular research design must consider what hypothesis is being tested, and assessment of the quality of a research article must consider whether the interpretations of the results are warranted. Research that is well designed for one purpose may be ill designed for another. Ethical concerns prohibit experimental designs—the "gold

standard" for assessing causal effects—for studies of abortion outcomes.

Abortion is not a randomly assigned treatment. All studies of abortion outcome, even longitudinal studies that report negative effects of abortion, are based on correlational designs. The effects of abortion are often confounded with the effects of an unwanted pregnancy. Many health-related factors, including exposure to intimate violence, create risks for both unwanted pregnancies and negative physical and mental health outcomes. Consequently, findings based on designs that fail to control for such covarying factors do not provide evidence that abortion is independently associated with the risk for negative outcomes—let alone serve as evidence that abortion actually increases the risk for such outcomes. Even if a study were to include all known covariates, however, it is essential to remember that correlation does not *prove* causality. Being forced to deliver an unwanted pregnancy is not the same thing as choosing to deliver an unwanted pregnancy when the option of abortion is available.

STUDIES OF PSYCHIATRIC CONSEQUENCES OF ABORTION

Using MEDLINE, PsycInfo, and the Social Sciences Citation Index, as well as references found in amicus briefs and current testimony, a literature search was conducted for English language, peer-reviewed articles on the psychological consequences of induced abortion published since 1990: abortion and pregnancy termination were paired in the search with anxiety, depression, post-abortion syndrome, suicide, mental health, and psychiatric disorders. Bibliographies of articles identified were also checked. From the resulting 216 articles, we selected a sample of studies that exemplify common errors in research methodology. All are widely cited research articles published in peer-reviewed journals that are currently used in amicus briefs and in testimony as evidence related to the question of whether abortion has severely damaging, clinically significant mental health outcomes.¹⁴ We compare and contrast research with different combinations of flaws, demonstrating how certain types of flaws are found in studies that are associated with particular patterns of findings. We also identify major articles that have attempted to correct the flaws in these studies.

Studies of Health Registers/Medical Records and of Physician Diagnoses

Finnish health registers. The most well designed record studies come from Finland, where health data is reliably collected on the entire population, with the consequence that sampling concerns are not an issue. These studies are cited

in support of the claim that abortion increases the risk of suicide and death, and are the model for several U.S. studies based on Medi-Cal records.

Gissler and colleagues³⁴ examined the demographics of all women in Finland who had committed suicide within one year of abortion or birth, and found a suicide rate of 34.7 per 100,000 abortions compared to 5.9 per 100,000 deliveries. The suicide rate in the general population was 11.3 per 100,000. The difference between the abortion group and the general population was statistically significant (OR, 5.9; 95% CI, 3.6–9.9). Marital status and class were identified as key covariates: of the women who had abortions, 10% were divorced, 62% were unmarried, and 41% belonged to the lowest of the three social class categories. Of those who committed suicide within one year of an abortion, 24% were divorced ($p = .004$), 41% were unmarried ($p = .011$), and 61% belonged to the lowest social class category ($p = .06$). Although the length of gestation before outcome was not ascertained, the vast majority of abortions in Finland are in the first trimester, and the vast majority of births are wanted.

The major flaw in this study for U.S. application is that the wantedness of the pregnancy was not ascertained. In the Finnish context, where use of contraception is normative, a larger proportion of abortions may be therapeutic than in the United States and thus involve wanted pregnancies. Indeed, the authors reported that the rate of suicide for divorced women, compared to other women, was "more than double after an abortion and eight-fold after a birth." They interpreted this finding as suggesting that that low social support is associated with suicide, but it could also suggest that pregnancies among divorced women are more likely to be wanted. The authors appropriately conclude that

the relation between suicide, mental disorders, life events, social class, and social support is a complex one. Abortion might mean a selection of women who are at a higher risk for suicide because of reasons such as depression. Another explanation for the higher suicide after an abortion could be the low social class, low social support and previous life events or that abortion is chosen by women who are at a higher risk of suicide because of other reasons.³⁵

In a 2004 records study, Gissler and colleagues³⁶ examined *pregnancy-associated* deaths in 156,789 women who had an abortion and in 865,988 women who had a live birth/stillbirth (a pregnancy-associated death is defined by the American College of Obstetricians and Gynecologists [ACOG] as the death of a woman while pregnant or within one year of the termination of the pregnancy, irrespective of the cause of the death). Women who had abortions were more likely to die from violent causes (60.0 vs. 9.6 per 100,000; $p < .001$).

Focusing on the more relevant indicator of abortion safety, *pregnancy-related death* (defined by ACOG as death while pregnant or within one year of termination of the pregnancy from any cause related to, or aggravated by, the pregnancy or its management, but not from accidental or incidental causes) revealed that such *mortality was higher in the birth group* than in the abortion group (3.9 vs. 1.3 per 100,000).³⁶ Again, the wantedness of the pregnancy was not ascertained, and the authors themselves caution readers not to assume causality.

California Medicaid (Medi-Cal) records. Reardon and colleagues have published numerous articles aimed at documenting negative effects of abortion.^{15,37-50} One of their major research strategies is to examine large databases of health information and to compare subsets of women who had abortion with other women. Several of their studies are based on records of Medi-Cal recipients.³⁷⁻⁴⁰

Unlike the population-based Finland record data, Medi-Cal data are not well suited for generalizing findings, even to other low-income women, due to high mobility in and out of the system. Further, these studies use differential exclusion criteria, with women having subsequent abortions excluded only from the delivery group. Although the studies identify "first pregnancy event," this expression is used to refer to the women's first pregnancy during the period studied, not the first such event in the women's lives. The high mean ages of the two comparison groups (25.64 and 24.83, respectively) suggest that many of the women may have had previous pregnancies or terminations before entering the study. Parity is unknown. Not only is nothing known about reproductive history, the only control for psychiatric history was based on Medi-Cal claims made in the year preceding the target delivery or abortion.

Like the Finland records studies, neither of the key covariates—pregnancy wantedness and exposure to violence—is controlled. Moreover, the Medi-Cal studies do not take into account other critical covariates identified in the Finnish and other studies, including socioeconomic class and marital status. They did not differentiate therapeutic abortions undertaken for health or fetal indications, or control for violence exposure.

The following is a more detailed analysis of problems found in the Medi-Cal studies.

Using Gissler and colleagues³⁶ as a model, Reardon and colleagues³⁷ examined death rates in the California Medi-Cal population. Beginning with an initial database of 249,625 female Medi-Cal recipients, they excluded "illegal immigrants" and undefined "aberrant, indeterminate and 'out-of-scope' data," and linked to California death records. The primary comparisons were based on 133,950 women who had either their first known abortion or delivery in the last six months of 1989 (83,690 in the delivery group; 50,260

in the abortion group); 1,713 deaths occurring in the subsequent eight-year period were identified. Age and months of eligibility were controlled. Again, there was no information about key covariates—pregnancy wantedness, marital status, race, previous parity, or abortion history. Neither ACOG-defined pregnancy-associated or pregnancy-related deaths (those occurring within a year of the end of pregnancy) were reported.

In the smallest time interval (1-2 years) after the target event, the overall death rate was higher in the abortion group than in the delivery group: 343.7 vs. 178.0 per 100,000, respectively (relative risk [RR], 1.95; 95% CI, 1.42-1269; $p < .0001$). Over the eight-year period of the study, the figures were 728.2 vs. 585.5 per 100,000 (RR, 1.30; 95% CI, 1.13-1.49; $p < .0002$). Rates of violent deaths were higher in the abortion group: 356.1 vs. 247.3 per 100,000, respectively (RR, 1.43; 95% CI, 1.17-1.74; $p < .001$).

Reardon and colleagues³⁹ used a similar design using the Medi-Cal database to compare the rates of inpatient psychiatric claims for first-time admissions during the four years following the first abortion or delivery occurring in the last six months of 1989. Women with inpatient psychiatric admissions or whose pregnancies ended during the year before the targeted six-month period were excluded. Other indicators of previous psychiatric history such as outpatient claims or any previous mental health problems or admissions were not controlled.

The resulting subsamples were not equally representative of the larger groups: 15,299 out of the 89,716 women (17%) who terminated their pregnancies in the last six months of 1989 were compared to 41,442, or 39%, of the 104,078 women who delivered. Age and months of Medi-Cal eligibility were controlled, but women who had subsequent abortions were differentially excluded from the delivery group.

Women in the abortion subsample had significantly higher inpatient admission rates at all time periods studied. Adjusted inpatient admission rates for year 1 were reported as 286.1 versus 145.3 per 100,000 for the abortion versus delivery groups, respectively (OR, 1.9; 95% CI, 1.3-2.8; $p < .01$). Subsequently, respective rates ranged from a low of 241.6 versus 113.5 per 100,000 in year 2, to a high of 324.6 versus 208.3 in year 4.

As in the other reports based on Medi-Cal data, there was no information about key covariates such as pregnancy wantedness, race, marital status, or other significant circumstances. In addition, women had to make a claim in the system during the period of the study for a negative outcome to be registered. Women who had an abortion (and therefore were not responsible for an infant) could have more opportunities to obtain education, employment, and increased incomes. Such women, no longer eligible for Medi-Cal, would exit the system and not be included in studies

that follow system activity over time. Only the most disadvantaged women would be retained in the abortion group. Moreover, women who had delivered may have been less likely to have a psychiatric admission because of child-care responsibilities, concern about being away from the infant, or fear of losing custody of their children.

Coleman and colleagues³⁸ used a parallel design, including differential exclusion, to examine outpatient admissions, but controlled for both inpatient and outpatient claims in the year before the pregnancy was ended. Adjusted outpatient admission rates for year 1 were reported as 470.0 versus 329.5 per 10,000 for abortion versus delivery groups, respectively (OR, 1.30; 95% CI, 1.18–1.44; $p < .0001$). Subsequently, respective rates ranged from 314.8 versus 244.3 per 10,000 in year 2, to 344.1 versus 288.9 in year 4. The differences found between abortion and delivery groups in years 3 and 4 were not statistically significant (95% CIs included 1.0; $p > .05$).

Reardon and colleagues³⁹ concluded that “the observed associations may be the result of less social support for women who have an abortion compared with women who deliver; reactions to abortion itself or common risk factors among mentally ill women and those who have abortions that have not yet been identified.”³⁹ However, the Medi-Cal studies are so flawed that methodological artifact may be the most likely explanation for the associations obtained.

Physician diagnoses. The report by Gilchrist and colleagues²⁸ exemplifies a study with good methodology. This large, longitudinal study began with a sample of women who had unplanned pregnancies, controlled for a large number of relevant covariates, and used a clinically relevant outcome measure (actual physician diagnoses). The prospective study of 13,261 women in England and Wales compared women with unplanned pregnancies who did not request an abortion, women who had an abortion, those whose request for abortion was denied, and those who requested abortion but then changed their minds. The analysis was controlled for age, history of psychiatric illness, marital status, smoking, education, parity, and abortion history. Exposure to violence was not controlled. Rates of total reported psychiatric disorders were no higher after abortion than after childbirth (63.5 per 1000 vs. 60.8–63.1 per 1000). Women with a previous history of psychiatric illness were most at risk for subsequent disorders, whatever the pregnancy outcome. Women without a previous history of psychosis had an apparently lower risk of psychosis after abortion than postpartum (RR, 0.4; 95% CI, 0.3–0.7), but rates of psychosis leading to hospital admission were similar.

The number of cases of deliberate self-harm (DSH) was low, but in women with no previous history of psychiatric illness, DSH (mainly, drug overdose) was more common

in those who had an abortion (RR, 1.7; 95% CI, 1.1–2.6) or were refused one (RR, 2.9; 95% CI, 1.3–6.3). The authors concluded that the DSH findings are most likely explained by confounding variables, such as adverse social factors, associated both with the request for termination and with subsequent self-harm. This conclusion is speculative since they did not control for either a history of childhood maltreatment or partner violence, although both have been strongly associated with both self-injurious behavior and abortion^{19–21,23,25–27,45,46} (see also the study of physician records of drug overdoses by Houston and Jacobsen).⁶¹ Gilchrist and colleagues²⁸ concluded that rates of total reported psychiatric disorders were no higher after abortion than after childbirth.

Analyses of Survey Data

Public data sets based on data collection not specifically aimed at studying abortion outcomes. Two articles that focus on depression risk following a first pregnancy—Reardon and Cougle⁴² and Cougle and colleagues⁴³—are based on the U.S. National Longitudinal Survey of Youth. This survey follows a cohort of men and women aged 14–21 years in 1979. Women with subsequent abortions were differentially excluded from the delivery group. Among women with an unintended first pregnancy, married women who aborted were reported to be at greater risk for depression than married women who delivered (OR, 2.38; 95% CI, 1.09–5.21). For unmarried women, the risk of depression was comparable in the abortion and delivery groups (OR, 0.94; 95% CI, 0.43–2.03).⁴² The findings are invalid, however, because the data were miscoded: the first unintended pregnancy was not correctly identified.⁴⁵

Using the same database, Cougle and colleagues⁴³ compared, relative to depression, women with a history of abortion versus delivery. The procedure was similar to the first study (i.e., based on miscoded data), except whether the pregnancy was intended or not is no longer identified. They reported that a prior history of abortion was significantly associated with scores on the Center for Epidemiologic Studies depression scale (OR, 1.65; 95% CI, 1.12–2.43; $p = .011$), a finding whose similarity to that of the previous study is not surprising, given that the two samples are from the same data set and closely overlap.

These studies illustrate other problems besides miscoded data. There was an attempt to measure the pre-pregnancy psychological state by assessing “external locus of control” scores, a measure that is not consistently correlated with poor mental health. Because this measure was not included in the study until 1980, women who became pregnant before that time were, of necessity, excluded from the sample. As Schmiede and Russo⁶² later showed, this sampling approach removes the women with the highest risk for depression—

that is, those who delivered at an early age—from the delivery group. The remaining sample is no longer representative of first pregnancies. Consequently, the results would not have been generalizable to all first pregnancies even if they had been based on properly coded data.

Schmiege and Russo⁶²⁻⁶⁴ examined the National Longitudinal Survey of Youth data in a study specifically designed to address the methodological problems in the Reardon and Cogle research^{42,43} described above. One thousand two hundred forty-two women were identified as having unwanted first pregnancies that ended with a delivery or an abortion. Covariates included education, income, age at first pregnancy, race, marital status, and total number of children. Sub-analyses were conducted to examine the possible effects of underreporting of abortion. Their analyses showed that in the delivery group (but not in the abortion group), the women who had been excluded in the previous studies^{42,43} due to having a pregnancy before 1980 had a significantly higher risk of experiencing depression than the women who had their first pregnancy after 1980—that is, who delivered at an older age (OR, 0.59; 95% CI, 0.43–0.81; $p = .0001$). When all women were included in the analyses, pregnancy outcome did not predict depression scores; 28.6% of women who had delivered versus 24.8% of those who had aborted had scores on the Center for Epidemiologic Studies depression scale in the high-risk category—a nonsignificant difference (OR, 1.19; 95% CI, 0.85–1.66; $p = .58$). The authors found no evidence that in the U.S. context of legalized abortion, terminating compared to delivering an unwanted first pregnancy changes the risk for subsequent depression. Delivering a first unwanted pregnancy was associated, however, with lower education and income and with larger family size, all risk factors for depression.

Additional analyses in the *British Medical Journal*'s rapid response format—provided by Russo and Schmiege^{63,64}—showed that debates over points of design did not change the pattern of results. No association of abortion with subsequent risk of depression was found.

Cogle and colleagues⁴¹ used data from the 1995 National Survey of Family Growth (NSFG) to examine risk of "generalized anxiety" following first unintended pregnancies ending in abortion or childbirth. Women were asked to remember the timing of both their first period of anxiety and their first pregnancy. Those who reported a period of anxiety before the first pregnancy were excluded from the analyses, and women with subsequent abortions were differentially excluded from the delivery group. Women who terminated a first pregnancy were found to have significantly higher rates of subsequent anxiety when controlling for race and age at interview (married women who aborted vs. carried to term [OR, 1.29; 95% CI, 0.66–2.75; $p > .05$]; unmarried women who aborted vs. carried to term [OR, 1.42; 95% CI, 1.03–1.95; $p < .031$]). However, standardized tests were not

used to measure post-abortion anxiety, and the analysis did not weight the data as required by the sampling design. The NSFG measure of anxiety did not correspond to the criteria used in either DSM-III-R or DSM-IV, resulting in estimated rates of generalized anxiety that are substantially higher than those found in other surveys.⁶⁵ Recall bias may also have affected the participant memory of the first onset of anxiety. Moreover, exposure to violence was not assessed despite the availability of information on rape history in the data set.

Noting that the analysis of NSFG data set in the above study had not used appropriate sampling weights, Steinberg and Russo²⁰ reanalyzed this data. When rape history, age at first pregnancy outcome, race, marital status, income, education, subsequent abortions, and subsequent deliveries were controlled, there was no relationship between abortion of the first pregnancy and subsequent anxiety symptoms.

Further, noting that the NSFG did not measure clinically diagnosable generalized anxiety disorder (GAD) or exposure to violence other than rape, Steinberg and Russo²⁰ then analyzed National Comorbidity Survey data to examine the relationship between abortion of the first pregnancy to GAD, social phobia, and posttraumatic stress disorder (PTSD). Although mental health outcomes are well defined in the National Comorbidity Survey, unwantedness of pregnancy is not identified. Even with this delivery group advantage, ever pregnant women who reported having an abortion did not differ in rates of GAD or social phobia from such women who had never had an abortion. Women who had had abortions, however, were found to have substantially higher rates of PTSD. Logistic regression analyses found these rates could be explained by the higher rates of violence in the lives of women in the abortion group. The authors concluded that the elevated rates of anxiety found by Cogle and colleagues⁴¹ likely reflect elevated PTSD symptoms that were unidentified due to inadequacies of the NSFG data set.

A highly cited study by Fergusson and colleagues²³ analyzed data from a 25-year longitudinal study of a birth cohort of New Zealand children. Even after adjusting for covariant factors such as greater childhood social and economic disadvantage, family dysfunction, and individual adjustment problems, significant associations were found between abortion and mental problems such as anxiety, depression, suicidal behaviors, and substance abuse ($p < .05$). This study is unusual in the range of outcomes assessed and the number of factors controlled. However, like the National Comorbidity Study data analyzed by Steinberg and Russo,²⁰ unwantedness of pregnancy was not controlled, making the interpretation of differences problematic. Moreover, unlike the National Comorbidity Study, exposure to partner violence was not assessed. Most importantly, in order to get an abortion in New Zealand, one must prove to two specialist consultants that the pregnancy would seriously harm the life,

physical, or mental health of the woman, that the woman is severely mentally handicapped, or that the pregnancy was the result of rape or incest. These conditions suggest an inclusion bias toward vulnerable, high-risk women in the abortion group.

Studies specifically designed to examine predictors of abortion outcomes. A carefully designed longitudinal study by Major and colleagues⁵⁶ aimed at examining predictors of variation in women's mental health after abortion assessed 882 women with standardized tests of depression, posttraumatic stress, and self-esteem at one hour pre-abortion and at one hour, one month, and two years post-abortion. Two years after the abortion, 72% of the women reported that they were satisfied with their decision, and 69% said that would have the abortion again if they had to make the decision over. The percentage of women experiencing clinical depression within two years after the abortion equaled the rate of depression nationally among all women 15-35 years of age. Depression levels at all times were lower post-abortion than pre-abortion, while self-esteem was higher post-abortion. The most common emotion was one of relief. A pre-pregnancy history of depression consistently predicted poorer postpartum mental health and more negative abortion-related emotions and evaluations. Although there was a 50% attrition rate, detailed analyses found no systematic bias in the follow-up group. This study was limited by the lack of a good baseline measure of mental health prior to discovery of pregnancy and by insufficient information on violence exposure; however, these factors, if present in the abortion group, should have increased the risk that the women would experience negative consequences.

Two studies have examined the impact of clinic demonstrators on women seeking abortion.^{29,30} Cozzarelli and Major²⁹ found that the greater the exposure to anti-abortion activities, such as picketing and blocking entrance to clinics, the more depression reported one hour post-abortion as measured by the Symptom Checklist-90 depression subscale. The presence of pro-choice escorts helped buffer the negative impact. Cozzarelli and colleagues³⁰ found that women conflicted about having an abortion were more depressed overall and more strongly affected by anti-abortion demonstrations. The number of picketers and the intensity of their activities were positively correlated with higher post-abortion depressive symptoms.

ASSESSMENT OF CLINICALLY RELEVANT LITERATURE

Space precludes an in-depth presentation for all relevant studies. In order to provide an overall evaluation of the most clinically relevant literature, articles that assessed the

most clinically relevant outcome variables have been summarized in Tables 1 and 2. The text box provides a key to the types of problems encountered in the articles summarized in the two tables. The articles in Table 1 used suicide, death, and physician diagnosis as outcome measures, whereas the articles in Table 2 used surveys and diagnostic interviews to assess the risk for mental disorders. Examination of the tables reveals that among the studies investigating the outcomes that are of most clinical relevance, the studies that have been used as evidence for an association between having an abortion and negative outcomes are multiply flawed. In particular, an association of abortion with negative mental health outcomes is found in designs that do not adequately control for wantedness of pregnancy. In designs that do control for wantedness of pregnancy, abortion is associated with negative mental health outcomes when differential exclusion is used to advantage the delivery group. In studies that adequately control for wantedness of pregnancy or exposure to violence, a significant association between abortion and negative mental health outcomes is not to be found, even though women who have abortions have experienced an unwanted pregnancy, and abortion is stigmatized in many areas of society.

CONCLUSION

Many scientific articles conclude with a statement that this topic requires more study. At the same time, public policy and medical procedures must be based on the current state of knowledge. Our analysis underscores the importance of selecting appropriate comparison groups and controlling for wantedness of the pregnancy; of using reliable measures of mental health and appropriate statistical analyses; and of identifying and controlling for psychiatric history, violence exposure, social support, personal characteristics and circumstances at the time of abortion, barriers to access, and other influences on self-reported mental status. To date, the published studies concluding that abortion causes psychiatric illness have numerous methodological problems; since their conclusions are questionable, they should not be used as a basis for public policy. Even when differences have been found, the majority of women who have abortions are well below clinical cut-off scores, and there is a substantial variation in the women's responses. The most well controlled studies continue to demonstrate that there is no convincing evidence that induced abortion of an unwanted pregnancy is per se a significant risk factor for psychiatric illness.^{20,21,23,28-32,39,52-54} This conclusion is consistent with the findings of the Royal Australian and New Zealand College of Obstetricians and Gynaecologists in its review of 72 studies and 27 review articles concerning the psychological consequences of terminating pregnancy.⁷⁶ The study concluded that legal and voluntary termination of pregnancy

rarely causes immediate or lasting negative psychological consequences in healthy women.

It is true that some women have feelings of sadness or regret, and that some women can be made to feel stigmatized and guilty, about choosing to terminate an unwanted pregnancy. For women who have more significant problems, the causal contribution of the abortion is not clear; a wide range of factors, both internal and external, affect women's responses—and interact in complex ways. These women should receive appropriate support and counseling. It should also be remembered that the best predictor of mental disorder after an abortion is a preexisting mental disorder, which is strongly associated with exposure to sexual abuse and intimate violence; to ignore these factors would be potentially

to ignore the actual causes of women's distress following an abortion. Further investigation should evaluate the impact of existing legislation and regulations, as well as the effects of social attitudes and behaviors, on women who have abortions. Perhaps more importantly, we need to investigate how best to foster resilience and to help women avoid unwanted pregnancies.

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Problem Classification for Tables 1 and 2

A. Sampling

1. Research participants not representative of women who have abortions
2. Based on data set lacking ability to control for factors known to be associated with unintended pregnancy & negative mental health outcomes
3. Previous psychiatric history used as selection criterion
4. Identification of sample based on retrospective self-report
5. Late trimester abortions likely overrepresented in sample
6. Differential exclusion that advantages delivery group
7. Generalization limited to first pregnancy outcome

B. Comparison groups—inadequate for assessing relative risks of pregnant women's options for resolving unwanted pregnancy

1. Comparison group that includes wanted pregnancies
2. Other inadequate group, including larger population in cases where scale norms are known
3. No comparison group
4. Other, including pre- vs. post- design with no other comparison group

C. Analysis of relevant variables

1. One or more basic demographic variables not controlled (age, race/ethnicity, education, income, marital status, parental status)
2. Previous psychiatric history
 - a. Not controlled
 - b. Inadequately controlled
3. Preexisting, co-occurring, & intervening conditions
 - a. Violence exposure
 - b. Marital context
 - c. Unwantedness of pregnancy

D. Outcome measures

1. Measure of debatable or unknown clinical significance
2. Measures feelings rather than disorders
3. Timing of outcome measure vis-à-vis abortion unclear

E. Faulty analyses

1. Multiple tests not corrected for chance
2. Uncorrected coding error
3. Failure to use required sampling weights
4. Number of births & abortions inadequately controlled
5. Other, including design & analyses not appropriate for assessing relative risks of having an abortion vs. terminating an unwanted pregnancy

F. Inappropriate interpretations & conclusions—conclusion of independent association not warranted

1. Unwantedness confounded with abortion
2. Violence exposure not controlled
3. Key demographic covariates not properly taken into account
4. Other key covariates not taken into account

TABLE 1. Methodological Problems in Studies Used to Support Claims That Abortion Leads to Psychiatric Problems: Medical and Health Records and Physician Reports

Study	Problems	Comment
Finland health register data (6 studies)		Although these studies are used to assert causal links between abortion and negative outcomes (see http://www.aaplog.org/downloads/AbortionComplications/Induced%20abortion%20and%20maternal%20suicide.pdf), the authors pointed out such an interpretation was unwarranted (see comments below).
Gissler et al. (1996) ³⁴	A2 B1 C1, C2a, C3a-c E1, E4 F1-F4	
Gissler et al. (1997) ⁵⁷	A2 B1 C1, C2a, C3a-c E4 F1-F4	
Gissler & Hemminki (1999) ⁵⁸	A2 B1 C1, C2a, C3a-c E4 F1-F4	These data were reported in an attempt to counter claims that Gissler et al. (1996) ³⁴ implied causation: "The current finding that the risks for accidental death and homicide also increase after an induced abortion, and our previous findings that women from lower social classes and single women were over-represented among women committing suicide after an induced abortion, do not support the hypothesis that abortion itself causes suicides" (p. 55).
Gissler et al. (2004) ⁵⁹	A2 B1 C1, C2a, C3a-c E4 F1-F3	
Gissler et al. (2004) ³⁶	A2 B1 C1b-d, C2a, C3a-c E4 F1-F3	The authors noted that the importance of distinguishing rates of pregnancy-associated vs. pregnancy-related deaths. Women in the abortion group had higher rates of pregnancy-associated deaths, but lower rates of pregnancy-related deaths, than women in the delivery group.
Gissler et al. (2005) ⁵⁹	A2 C1, C3a-c E4 F1, F2	Authors underscore need for information on relevant covariates, including "mental health, social well being, substance abuse, and socio-economic circumstances" in further analyses (p. 462).
California Medi-Cal system records (4 studies; U.S.)		The authors interpreted their results as justification for restricting access to abortion services. Sampling and design flaws in the studies based on this data set were multiple, severe, and biased in ways that advantaged the delivery group.
Reardon et al. (2002) ⁶⁷	A1, A2, A5, A6 B1 C1, C2b, C3a-c E1, E4 F1-F4	
Coleman et al. (2002) ⁶⁸	A1, A2, A5, A6 B1 C1, C2b, C3a-c E1, E4 F1-F4	

TABLE 1. Methodological Problems in Studies Used to Support Claims That Abortion Leads to Psychiatric Problems: Medical and Health Records and Physician Reports (*Continued*)

Study	Problems	Comment
Reardon et al. (2003) ⁵⁹	A1, A2, A3, A5, A6 B1 C1, C2b, C3a-c E1, E4 F1-F4	
Reardon & Coleman (2006) ⁶⁰	A1-A3, A5, A6 B1 C1, C2b, C3a-c E4 F1-F4	
Study based on records of physicians (5) in general practice: female patients hospitalized for drug overdose (UK)		
Houston & Jacobson (1996) ⁵¹	A2 B2 C1 D3 E4 F1-F4	"One possible explanation [is] that overdose follows a termination as a result of increase guilt, self-recrimination or other psychological sequelae. This theory is not supported by the data in this study because there were more terminations following overdoses than vice versa" (p. 737).
Longitudinal study based on physician diagnosis: outcomes of unplanned pregnancies (UK)		
Gilchrist et al. (1995) ²³	C1, C3a,c E1 F2	This study is the only one in Table 1 that was based on data collection initially designed to study the outcomes of unplanned pregnancy. It was jointly sponsored by the Royal College of General Practitioners and Royal College of Obstetricians and Gynaecologists. Rates of psychiatric illness were consistently related to rates of previous psychiatric illness; however, the authors specifically stated that "no overall increase in psychiatric morbidity [associated with abortion] was found" (p. 243).

TABLE 2. Standardized Measures or Self-Report of Physician Diagnosis

	Problems	Comment	Most relevant findings
Studies based on data not gathered specifically to study abortion outcomes			
Australian Longitudinal Study on Women's Health			
Taft & Watson (2008) ⁶⁰	A2, A4 B2 C2b, C3c F1, F4	Estimated sample of 9,692 weighted to reflect the population distribution of Australian women aged 22-27 in 2000.	With nothing controlled, 29% of women not reporting abortion, vs. 36%-38% of women reporting abortion, exceeded the CESD-10 cutoff score. The latter figure was reported as comparable to the 27% figure found for women reporting 2 or more births and was substantially less than the 38%-45% figure for women who experienced partner violence. Despite failure to control for pregnancy unwantedness, having an abortion was not found to significantly increase depression risk when partner violence and other covariates were controlled.

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TABLE 2. Standardized Measures or Self-Report of Physician Diagnosis (*Continued*)

	Problems	Comment	Most relevant findings
Christchurch Health and Development Study (New Zealand)			
Fergusson et al. (2006) ²³	A1, A2, A4 B1 C1, C3a-c D3 E4 F1-F3	Compared never pregnant, ever pregnant, and abortion groups of women aged 15-25 years; <i>n</i> at age 25 for these groups = 301, 181, and 74 (respectively). Timing of abortion unclear vis-à-vis outcome variables except for prospective analysis of number of mental disorders.	In this study, where neither violence exposure nor unwantedness was controlled, concurrent analyses found the abortion group to have significantly higher rates of depression, illicit-drug dependence, suicidal ideation, and total mental health problems than the ever pregnant group and, except for alcohol and anxiety disorders, significantly higher rates of disorders than the never pregnant group. In the prospective analysis, the abortion group had a significantly higher mean number of disorders (mean = 1.27) than ever pregnant/no abortion (mean = 0.81) or never pregnant (mean = 0.57) groups.
Commonwealth Fund Women's Health Survey (U.S.)			
Russo & Denious (2001) ²¹	A2, A4 B1 C1, C2a, C3c D1, D3 E3 F1	Compared 324 women reporting abortion to 2,201 women who did not. Continuous depression score based on abbreviated CES-D items used in analyses, so clinical significance unclear; timing of reported diagnosis of anxiety or depression by physician vis-à-vis abortion unclear.	With nothing controlled, 21.3% of the women in the sample who reported having an abortion, vs. 13.3% of the women who did not, reported being told by a physician that they had anxiety or depression; 10.5% vs. 5%, respectively, reported suicidal thoughts. Despite failure to control for pregnancy unwantedness, abortion group did not have significantly higher depression scores and were not significantly more likely either to report being diagnosed with anxiety or depression by a doctor or to report suicidal thoughts when violence exposure and other relevant covariates were controlled.
Harvard Study of Moods and Cycles (U.S.)			
Harlow et al. (2004) ⁶¹	A1-A4 B4 C1 E5 F1, F2	332 women who had a past or current history of major depression as measured by DSM criteria were compared to 644 women with no such history on a variety of factors, including pregnancy history; sample not representative of abortion population.	Depressed and nondepressed women were equally likely to have 0 or 1 abortion, but depressed women were 3 times more likely than nondepressed women to have had multiple abortions; violence exposure and pregnancy unwantedness not controlled.
National Comorbidity Survey analyses (U.S.)			
Steinberg & Russo (2008) ^{23a}	A2, A4, A7 B1 C3c F1	1813 women who delivered a first pregnancy were compared to 274 women who terminated an unintended first pregnancy. Although primarily focusing on first-pregnancy outcome, women reporting 0, 1, and multiple abortions were also compared; women who reported multiple abortions were more likely to experience violence, PTSD, and social anxiety than women reporting 0 or 1 abortion.	Despite failure to control for pregnancy unwantedness, women reporting an abortion on their first pregnancy did not significantly differ in rates of generalized anxiety disorder (6.2% vs. 7.3%), PTSD (10.2% vs. 7.8%), or social anxiety (12.0% vs. 13.5%) when compared to women reporting a live birth on their first pregnancy and when violence exposure and other relevant covariates were controlled.

TABLE 2. Standardized Measures or Self-Report of Physician Diagnosis (*Continued*)

	Problems	Comment	Most relevant findings
National Survey of Family Growth (U.S.)			
Cogle et al. (2005) ⁴¹	A1-A3, A4, A6, A7 C1, C2b, C3a,b D1 E3, E4 F2-F4	After sample exclusions, 1813 women who delivered an unintended first pregnancy were compared to 1033 who terminated an unintended first pregnancy. Outcome variable "generalized anxiety" not congruent with DSM diagnostic criteria for generalized anxiety disorder; and meaning of cutoff score used is unclear. Although rape history was available in the data set, it was not included as a covariate in the analyses.	13.7% of women in the abortion group exceeded the cutoff score for the anxiety outcome variable compared to 10.1% of the delivery group.
Steinberg & Russo (2008) ^{20,a}	A2, A4, A7 C1, C3a D1 F2	Analyses designed to correct design flaws in Cogle et al. (2005). ⁴¹ 2314 women who delivered an unintended first pregnancy were compared to 1166 women who terminated an unintended first pregnancy. Rape history included in analyses, but no information on other forms of violence. Anxiety outcome variable not congruent with DSM criteria for generalized anxiety disorder.	20.2% of women who terminated their first unintended pregnancy, compared to 15.2% of women who delivered such pregnancies, exceeded the anxiety outcome cutoff score; however, when pregnancy intendedness, rape history, pre-pregnancy anxiety, and other covariates were appropriately controlled, women reporting an abortion on their first unintended pregnancy did not significantly differ in anxiety from women delivering their first unintended pregnancy.
National Longitudinal Study of Youth (U.S.)			
Reardon & Cogle (2002) ⁴²	A1, A2, A4, A6, A7 B2 C1, C2a, C3a,b E2-E4 F1, F4	After correcting an initial coding error, corrected findings based on 783 women identified as delivering an unintended first pregnancy were compared to 293 women identified as terminating an unintended first pregnancy.	Findings are not reported as they are still based on another miscoding error that failed to identify the women's first pregnancy.
Cogle et al. (2003) ⁴³	A1, A2, A4, A6, A7 B1 C1, C2a, C3a-c E2-E4 F1, F2, F4	Findings based on 1197 women identified as delivering a first pregnancy were compared to 164 women identified as terminating a first pregnancy. The design is similar to Reardon & Cogle (2002) ⁴² except that intendedness of the first pregnancy is not controlled; the data are still miscoded.	Findings are not reported as they are based on miscoding that failed to identify the women's first pregnancy.
Schniege & Russo (2005) ⁴²	A2, A4, A7 C1, C2b, C3a, C3c E3 F2, F4	In corrected analyses, 1283 women who delivered an unintended first pregnancy were compared to 461 women who terminated an unintended first pregnancy. This study, when combined with additional analyses in the journal's rapid-response addenda to the article, corrected the coding errors, as well as some design flaws, of the above two studies, along with their initial analyses.	In the final analyses, adjusted for covariates, 25% of the abortion group, compared to 28.3% of the delivery group, exceeded the CES-D cutoff score; for married women, the largest subgroup, the figures were 17.8% vs. 21.2%; these differences were not statistically significant.

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TABLE 2. Standardized Measures or Self-Report of Physician Diagnosis (*Continued*)

	Problems	Comment	Most relevant findings
Studies based on data specifically collected to study abortion outcomes			
Broen et al. (2004), ⁶³ (2005), ⁶³ (2006) ⁶⁴ (Norway)	A1–A3	80 women having an abortion and a	Women experiencing miscarriage reported
	B1, B2	comparison group of 40 women who had	more distress at 10 days and 6 months
	C1, C2b, C3a–c	a miscarriage were interviewed 10 days,	after the event than women who had an
	D1	6 months, 2 years, and 5 years	abortion, but improved more rapidly than
	E4	post-event; reasons for, and feelings	the abortion group after that time; the
	F1, F2	about, the abortion and stress reactions	strongest predictor of distress at these
		were assessed.	times was "pressure from a male partner."
		Feelings were assessed by an 11-item	The abortion group had significantly higher
		index with a theoretical range of 1 to 5	IES scores for avoidance and for feelings of
		(1 = not at all; 5 = very much); means	guilt, shame, and relief than the
		for the 9 negative items at 2 years	miscarriage group at 2 and 5 years
		post-abortion ranged from 1.7 to 2.2;	post-event.
		means for the positive items ranged	At 10 days post-abortion, 30% were identified
		from 2.7 to 3.9 (reverse scored), with an	as cases based on IES intrusion scores; at
		overall mean of 2.0 for the index; the	2 years post-abortion, that figure was 18.1%,
		clinical significance of these low ratings	primarily due to an increase in the number
		is not clear.	of women who scored > 19 on the avoidance
		The authors did not use DSM criteria for	subscale over time (from 12.5% to 16.7%).
		assessing acute stress disorder; a	At 10 days, 23.8% of women were identified
		version of the IES was used to assess	as cases based on IES intrusion scores; at
		stress reactions; a cutoff score of 19 on	2 years post-abortion, that figure was 1.4%.
		either of the IES subscales (intrusion	The comparison group was a subsample of
		and avoidance) was taken to define	women participating in a survey of the
		caseness, with "persons defined as cases	general population of Norway; mean scores
		most likely to have a considerable	for women aged 30–35 years ($n = 2,879$) for
		amount of posttraumatic stress	HADS anxiety was 4.6 ± 3.4 and for HADS
		reactions" (p. 38).	depression was 2.6 ± 2.7 ; at 5 years the
		The HADS was used to assess anxiety and	comparable figures for the abortion group
		depression; theoretical scores range	were 5.9 ± 4.6 and 2.7 ± 3.2 , respectively.
		from 0 to 21; the clinical significance of	
		scoring below 6 on the scale is unclear.	
Congleton & Calhoun (1993) ⁶⁵ (U.S.)	A1, A2, A4, A5	Compared convenience samples of 25	Women who were distressed had significantly
	B4	women who described themselves as	higher scores on religiosity, were more
	C1, C2, C3a, C3c	distressed in response to abortion, to 25	often affiliated with conservative churches,
	D1, D2	women reporting relief or neutral	reported less social support and confidence
	E5	responses. Recruitment procedures for	in the abortion system, and had a higher
		the samples were not described.	initial stress response; 48% of the
			distressed group, compared to 0% of
			women in the nondistress group, reported
			feelings of "loss" immediately after the
			abortion; the comparable feelings for
			sadness/grief were 60% vs. 44% (with the
			majority of the nondistressed group
			specifying sadness rather than grief).
Lauzon et al. (2000) ⁶⁶ (Canada)	A1, A2, A4 (for	Study of 197 French-speaking,	Before the abortion, 55.6%, and 1–3 weeks
	control group	first-trimester abortion patients from 3	after the abortion, 41.7%, of the women
	only)	clinics in Montreal; subjects were	were identified as having great distress,
	B1, B2	compared to selected respondents to	compared to 21.6% of the comparison
	C1, C2a, C3a–c	Quebec Public Health Survey and to	group (all female); these figures were not
	E5	male partners; the samples differed in a	adjusted for relevant covariates, including
	F1–F4	number of relevant demographic	unwantedness of pregnancy and violence
		variables.	exposure.

TABLE 2. Standardized Measures or Self-Report of Physician Diagnosis (*Continued*)

Problems		Comment	Most relevant findings
		Psychological distress was assessed by Ilfeld Psychiatric Symptom Index, using the 80th percentile as the cutoff score for "great distress."	Predictors of great distress for women included: fear of negative effects on relationship, not having a previous child, unsatisfactory relationship, suicidal ideation in whole life and past year, worried about abortion, ambivalence about abortion decision, negative perception of own health, and having discussed the situation with someone other than a partner. Women having abortions had significantly higher lifetime (14.7%) and past year (3.7%) rates of suicidal gesture than comparison group (5.8% and 1.7%, respectively).
Major et al. (1990) ⁸⁷ (U.S.)	A1 B2, B4 C2a, C3a, E4, E5 F1, F2	Study of 283 women obtaining a first-trimester abortion at a free-standing, private abortion clinic. Depression was assessed by the 13-item short form of the BDI; for comparison with national norms, the rates of exceeding cutoff scores were not adjusted for covariates.	The study focused on the effects of women's (1) perceptions of social support from their partners, families, and friends, and (2) self-efficacy for coping, as assessed on multiple dimensions—including depression, mood, physical complaints, and anticipation of negative consequences—during the 30-minute recovery period after a first-trimester abortion. Using the BDI-recommended cutoffs for the short form, 64% of the sample exhibited no or minimal depression (a score of 0–4), 21% indicated mild depression (a score of 5–7), 11% indicated moderate depression (a score of 8–15), and 4% indicated severe depression (a score above 15). Women who perceived high support from their families, friends, and partners had higher self-efficacy for coping, which, in turn, predicted better adjustment on the psychological measures but not on the physical-complaint measure. Women who told close others of their abortion but perceived them as less than completely supportive had poorer post-abortion psychological adjustment than either women who did not tell or women who told and perceived complete support.
Major et al. (1992) ⁸⁸ (U.S.)	A1, A2 B2 C1, C2b, C3a E4, E5 F1, F2	Study based on 73 couples prior to the women obtaining a first-trimester abortion of an unwanted pregnancy; depression was assessed 30 minutes post-abortion by the BDI.	Focused on the impact of male partners' attributions for the cause of the pregnancy and their expectations for coping with abortion on women's post-abortion adjustment. Male partners' coping expectations affected women's adjustment only if the women themselves had low coping expectations; among women with low coping expectations, those accompanied by partners who also had low coping expectations were the most depressed; men's attributions were unrelated to their partner's adjustment.

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TABLE 2. Standardized Measures or Self-Report of Physician Diagnosis (*Continued*)

	Problems	Comment	Most relevant findings
Cozzarelli (1993) ⁶⁹ (single-site sample; U.S.)	A1, A2 B2, B4 C1, C2b, C3a E4, E5 F1, F2	Studies based on 291 women who obtained a first-trimester abortion at a private, free-standing clinic; women completed pre-abortion, immediate post-abortion, and 3-week follow-up questionnaires containing the SCL-90 depression subscale and 9-item scale assessing affective state. Prior to the abortion women were asked about their perceptions of anti-abortion demonstrator and pro-choice escort activity; 75% of women said they had been spoken to by picketers; 54% said they had been blocked by picketers.	A post-abortion distress index was created by combining the SCL-90 depression subscale and a 9-item scale assessing current affective state; clinical significance of scores was therefore unclear. Focused on effects of self-efficacy regarding post-abortion coping on psychological adjustment immediately after abortion, with 3-week follow-up; pre-abortion depression strongly predicted both self-efficacy and adjustment; at both time points, self-efficacy mediated the effects of self-esteem, optimism, and perceived control on adjustment. Outcome measured by the SCL-90 depression subscale.
Cozzarelli & Major (1994) ²⁹ (single-site sample; U.S.)			Women who said that the anti-abortion demonstrators tried to block their entry to the clinic were more upset by the picketers, and women who were more upset by the picketers, in turn, had higher levels of post-abortion depression; the more aggressive the picketing, the more depressed the women were immediately after their abortions.
Major et al. (1997) ⁷⁰ Major et al. (1998) ⁷¹ Cozzarelli et al. (1998) ⁷² Major & Gramzow (1999) ³¹ Major et al. (2000) ²⁶ Cozzarelli et al. (2000) ³⁰ Quinton et al. (2001) ⁷³ (multisite sample [all]; U.S.)	A1, A2 B2, B4 C3a, D1, D2 (except for analyses of depression when assessed by the Diagnostic Interview Schedule) E4, E5 F1, F2	This research focuses on predictors of variation in response to first-trimester abortion of an unintended pregnancy; since different studies focus on different predictors, they are reported separately. All are based on data from women obtaining a first-trimester abortion from one of three free standing abortion clinics who completed pre- and post-abortion questionnaires on the day of their procedure—and also, depending on the study, approximately 1 month or 2 years post-abortion; of the 882 that initially agreed to participate, 442 were retained in the study for 2 years; careful attrition analyses found pre-abortion mental health not related to retention. Pre-abortion and post-abortion depression and self-esteem, post-abortion emotions, decision satisfaction, perceived harm and benefit, and abortion-specific PTSD were assessed; the Diagnostic Interview Schedule was used to assess lifetime history of depression before the abortion. Depression at each time point in the research was assessed using the Brief Symptom Inventory.	The most relevant findings here are the absolute levels of the scores, the pre- vs. post-abortion differences, and the comparisons with national norms; although these results varied slightly across samples due to sampling differences associated with the predictor variable of interest, they are not independent; thus, only relevant findings related to the predictor variables are reported for each study, and the results for outcome variables, summarized across studies, are reported here. At one month after the abortion (615 women in sample). Psychological distress (SCL-90 composite): mean = .59/.66; range, 0–4.0. Ryff's positive well-being: mean = 4.58–4.60; range, 2.3–6.0. Compared to norms for nonpatient samples, women's post-abortion distress scores were slightly higher than average but below clinical cutoffs for each of the three BDI subscales: .45 for anxiety, .75 for depression, and .78 for hostility; for nonpatient female samples, the figures were .22 for anxiety, .30 for depression, and .22 for hostility (clinical cutoffs are .87 for anxiety, 1.07 for depression, and .78 for hostility).

TABLE 2. Standardized Measures or Self-Report of Physician Diagnosis (*Continued*)

Problems	Comment	Most relevant findings
	Psychological distress was assessed by a composite score of the means of the depression, anxiety, hostility, and somatization scales of the SCL-90, which could range from 0 (not at all) to 4 (a great deal). ^b	At two years after the abortion (442 women in sample): 80% were not depressed; the 20% rate of depression in the sample was similar to that of among all women aged 15 to 35; 1% reported abortion-specific posttraumatic stress; 6.2% reported being both depressed and dissatisfied with their decisions; 47% reported feeling they would be stigmatized (this feeling was significantly correlated (.20) with psychological distress).
	Abortion-specific traumatic stress syndrome (post-abortion syndrome) was assessed at 2 years, with a published measure of PTSD used with Vietnam War veterans adapted to focus on abortion experiences.	Self-esteem increased and depression decreased from pre- to post-abortion; the percentages of women who exceeded the Diagnostic Interview Schedule cutoff score for depression were 26% vs. 20%, pre- and post-abortion, respectively.
	Ryff's positive well-being scale assessed overall positive well-being, with scores that could range from 1 to 6 (low to high).	Pre-abortion mental health was the best predictor of post-abortion mental health and of feelings about an abortion.
Major et al. (1997) ⁴³ (U.S.)		Focused on women's perceptions of negative (conflict) and positive (support) from mothers, partners, and friends before having an abortion on negative (distress) and positive (well-being) indexes of adjustment after the abortion.
		Pre-abortion conflict uniquely predicted distress, whereas support uniquely predicted well-being.
Major et al. (1998) ⁴⁴ (U.S.)		Focused on the effects of self-esteem, control, and optimism on post-abortion adaptation (distress, well-being, and decision satisfaction) one month post-abortion.
		Women with more resilient personalities appraised their abortion as less stressful and had higher self-efficacy for coping with the abortion.
		More positive appraisals predicted greater acceptance/reframing/coping and less avoidance/denial, venting, support seeking, and religious coping.
		Acceptance/reframing predicted better adjustment on all measures, whereas avoidance/denial and venting related to poorer adjustment on all measures.
		Greater support seeking was associated with reduced distress, and greater religious coping was associated with less decision satisfaction.

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TABLE 2. Standardized Measures or Self-Report of Physician Diagnosis (*Continued*)

Problems	Comment	Most relevant findings
Cozzarelli et al. (1998) ⁷² (U.S.)		Post-abortion distress and positive well-being varied with a women's mental model of attachment; self-esteem, feelings of self-efficacy for coping with abortion, perceived support, and perceived conflict from the woman's male partner were significantly related to outcomes.
Major & Gramzow (1999) ⁸¹ (U.S.)	Measure of stigma weak; significant correlation (.20) reported between feeling stigmatized and psychological distress, but the data were not analyzed in a way that directly compared women who felt stigmatized and those who did not; the clinical significance of the difference in distress between women who feel stigmatized and those who do not is unclear, especially since the mean score for the SCL-90 composite measure of psychological distress in these analyses = 0.72, down from a mean score of 1.01 in their pre-abortion assessment.	<p>Focused on effects of stigma of abortion and on psychological implications of concealment at 2 years post-abortion, testing a theoretical model that concealing a stigma may be associated with increases in psychological distress due to a felt need for secrecy, thought suppression, and thought intrusion.</p> <p>47% of the women "agreed" or "strongly agreed" that they would be looked down on (stigmatized) if others knew about the abortion, and 44.9% felt that they needed to keep the abortion a secret from their families and friends.</p> <p>Although most women reported experiencing intrusive thoughts, only 3.4% said they experienced them "quite a bit" or "a great deal"; emotional disclosure moderated an association between intrusive thoughts and distress; disclosure was associated with decreases in distress among women experiencing intrusive thoughts of their abortion, but was unrelated to distress among women not experiencing intrusive thoughts.</p> <p>Summarized findings at 2 years after abortion. In addition to those presented above:</p> <p>Depression decreased, and self-esteem increased, from pre-abortion to post-abortion; negative emotions increased, and decision satisfaction decreased.</p> <p>26% of the women experienced an episode of clinical depression at some time prior to the pregnancy, and 20% experienced an episode of clinical depression in the 2 years after their abortion. Pre-pregnancy history of depression was a risk factor for depression, lower self-esteem, and more negative abortion-specific outcomes.</p> <p>69% said that they would have the abortion again; 72% reported more benefit than harm from their abortion; younger age and having more children pre-abortion predicted more negative abortion evaluations.</p>
Major et al. (2000) ⁸⁶ (U.S.)		

TABLE 2. Standardized Measures or Self-Report of Physician Diagnosis (Continued)

	Problems	Comment	Most relevant findings
Cozzarelli et al. (2000) ³⁰ (U.S.)			Focused on responses, both pre-abortion and 2 years post-abortion, to anti-abortion picketing; feeling guilty in response to seeing picketers and having high personal conflict about abortion predicted immediate post-abortion depression, whereas feeling angry was unrelated to post-abortion depression; guilt and personal conflict had no direct effects on depression 2 years post-abortion.
Quinton et al. (2001) ⁷³ (U.S.)			Focused on responses of minors vs. adults, 1 month and 2 years post-abortion; minors were relatively less satisfied with their abortion decisions and felt less benefit from the abortions than did adults 1 month post-abortion, but they did not differ from adults in adjustment 2 years post-abortion. Minors were not more depressed than adults at either time period, and their decision satisfaction and differences in adjustment 1 month post-abortion were explained by minors' reduced self-efficacy appraisals for coping, greater use of avoidant coping strategies, and greater perceived parental conflict.
Rue et al. (2004) ⁴⁴ (U.S. & Russia)	A1, A4 B3 C2a E5 F1-F4	Focused on differences between 217 American and 331 Russian women obtaining abortions on a pregnancy-loss questionnaire containing a 14-item PTSD scale matching DSM-IV criteria for PTSD. Sample selection and procedures differed for the 2 groups; no comparison groups of other women in either country.	14% of American and 0.9% of Russian women met diagnostic criterion for PTSD; adjusted means (SD) for the 14-item scale = 8.51 (.31) and 3.73 (.23) for each group, respectively.
Sit et al. (2007) ⁷⁴ (U.S.)	A1, A2 B4 C1, C2b, C3a, C3b E5 F1-F3	Groups consisting of 47 women who obtained surgical abortions and 31 women who obtained nonsurgical abortions at 9 weeks gestation were compared; pre- vs. ~ 1-month post-abortion scores on the Edinburgh Postnatal Depression Scale were obtained.	No differences in depression between types of abortion; both groups experienced significant decline in depression from pre- to post-abortion (from 35%-36% to 17%-21%, respectively).
Williams (2001) ⁷⁵ (U.S.)	A1, A2, A4 B1 C1, C2, C3a, C3c D1 E4 F1-F3	45 women waiting to see a physician in a gynecological clinic reporting history of abortion compared to 48 comparable women reporting no abortion history; Grief Experience Inventory used in study is of unknown clinical significance.	No significant differences between the two groups on any of the 12 clinical scales of the Grief Experience Inventory.

BDI, Beck Depression Inventory; CESD, Center for Epidemiological Studies depression scale; HADS, Hospital Anxiety and Depression Scale; Impact of Events Scale; NCS, National Comorbidity Survey; NSFG, National Survey of Family Growth; PTSD, posttraumatic stress disorder; SCL-90, Symptom Checklist-90.

^aThis article reports two studies—one analyzing the National Comorbidity Survey and one analyzing the National Survey of Family Growth. In this table the results for these two independent analyses are presented separately.

^bThe SCL-90 is a standardized measure, but the clinical significance of these findings is unclear in view of the low mean and restricted range exhibited in the sample.

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